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MONTANA STATE HIGHWAY COMMISSION
PLANNING SURVEY DIVISION

ECONOMIC ANALYSIS OF ALTERNATE ROUTES FOR U. S. HIGHWAY NO. 10 (INTERSTATE ROUTE 101) IN THE VICINITY OF BOZEMAN, MONTANA

October 1, 1957

FOREWORD

An analysis of this type is prepared for the purpose of comparing the relative merits of two or more alternate routings of a proposed highway. The analysis compares the costs of construction and maintenance for the alternate routes and the relative benefit of the routes to the highway user. The route which provides the greatest user benefit in relation to the construction and maintenance costs is the route which would be recommended from the standpoint of the motoring public.

The analysis does not take into consideration possible loss of business to commercial establishments, the effect on local property values, the effect on residential areas, the disruption of local facilities, or the destruction of local properties. For this reason, the economic analysis is not the sole criterion for selection of alternate routes, and the results of the analysis must be evaluated in relation to these other considerations.

DESCRIPTION OF ALTERNATE ROUTES

After viewing aerial photographs of the region and making a field inspection, the Interstate Division selected two routes in the vicinity of Bozeman as being most feasible from a construction standpoint. Both of these routes are located in the area to the north and east of the City of Bozeman. The approximate locations of the alternate routes are shown on the attached map of the area.

The tentative location of Interstate Route No. 101 through the Gallatin Valley has been established on the south side of the railroad tracks through the area. As the highway approaches Bozeman, from the west, the two alternates diverge at a point about one mile west of the present location of U. S. Highway No. 10 in the vicinity of the overpasses north of Bozeman.

From the point of divergence the North Route extends in an easterly direction across U. S. Highway No. 10 to a point on North Rouse Avenue where it turns in a southeasterly direction to a point of convergence with the South Route. Beyond this point, the common route continues to a proposed interchange east of the city and then in an easterly direction on a location north of the Northern Pacific Railway tracks.

The South Route leaves the point of divergence and extends in a southeasterly direction along the north limits of Bozeman to the same point of convergence in the eastern part of the city. From this point the route follows the line described for the North Route.

The South Route follows a more direct line between the two common termini and for this reason it is shorther by about .06 of a mile. It also shortens the travel distance into Bozeman by about one tenth of a mile.

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TRAFFIC SERVICE

During the summer of 1953, the Planning Survey Division conducted a survey in cooperation with the U. S. Bureau of Public Roads and the City of Bozeman. Part of the survey consisted on an origin-destination study to determine the origins and destinations of traffic entering and leaving the city. The results were summarized to show the distribution of trips by predetermined zones within the city. The traffic passing through the city was also classified by point of entry and departure.

The results of this survey were reviewed in order to evaluate the relative service to traffic which would be provided by the alternate routes. This was accomplished by measuring the travel distance for trips from each zone to the closest point of access and to a common point on the Interstate Highway via each alternate. Upon multiplying the trip length from each zone by the number of trips, the quantity of vehicle miles of travel was computed. Operating cost factors were then applied to the vehicle miles of travel for each route to compute the relative cost to the highway-user of the alternate routes.

In analyzing the results of the origin-destination survey for Bozeman, it became evident that only the through traffic and traffic on west U.S. No. 10 would be affected by the alternate routes. Traffic into and from the city on U. S. No. 191 would not reach the Interstate Highway. Traffic on east U. S. No. 10 into or from the city would use the interchange on the common route east of the point of divergence of the alternates, and consequently this traffic would not be affected by the selection of either alternate.

The traffic survey showed that there was a small amount of external traffic on the main highways originating in the rural area to the north of Bozeman. The amount of traffic was not of sufficient importance to warrant the construction of an interchange to provide access to the Interstate Highway. It also was not of sufficient importance to affect the results of the analysis, so it was omitted from consideration.

HIGHWAY-USER BENEFITS

The evaluation of traffic service provided by the alternate routes produced the following results:

	NORTH ROUTE	SOUTH ROUTE
Annual trips	1,263,630	1,263,630
Trip length	3.529 miles	3.475 miles
Highway-user cost per trip	$ 0.4886	$0.4747
Total highway-user cost	$617,412	$599,870
Annual Savings via South Route		$ 17,542

The results show that the South Route would save the highway user $17,542 per year when compared with the North Route.

CONSTRUCTION AND MAINTENANCE COSTS

The Interstate Division estimated that the North Route could be constructed for $2,274,060 and the South Route could be constructed for $2,154,710. It is believed that a high standard highway of this type should have a service life of about 40 years, with the provision that it be resurfaced at some time during this period.

The following table summarizes the annual construction and maintenance costs for each alternate route.

	NORTH ROUTE	SOUTH ROUTE
Construction length (between common termini)	3.61 miles	3.55 miles
Total construction cost	$2,274,060	$2,154,710
Annual amortized construction cost (40 year period, with resurfacing)	$ 58,400	$ 55,394
Annual Maintenance Cost	$ 7,220	$ 7,100
Combined annual construction and maintenance cost	$ 65,620	$ 62,494
Cost per trip	$ 0.0519	$ 0.0495
Annual Savings for South Line		$ $3,126

CONCLUSIONS

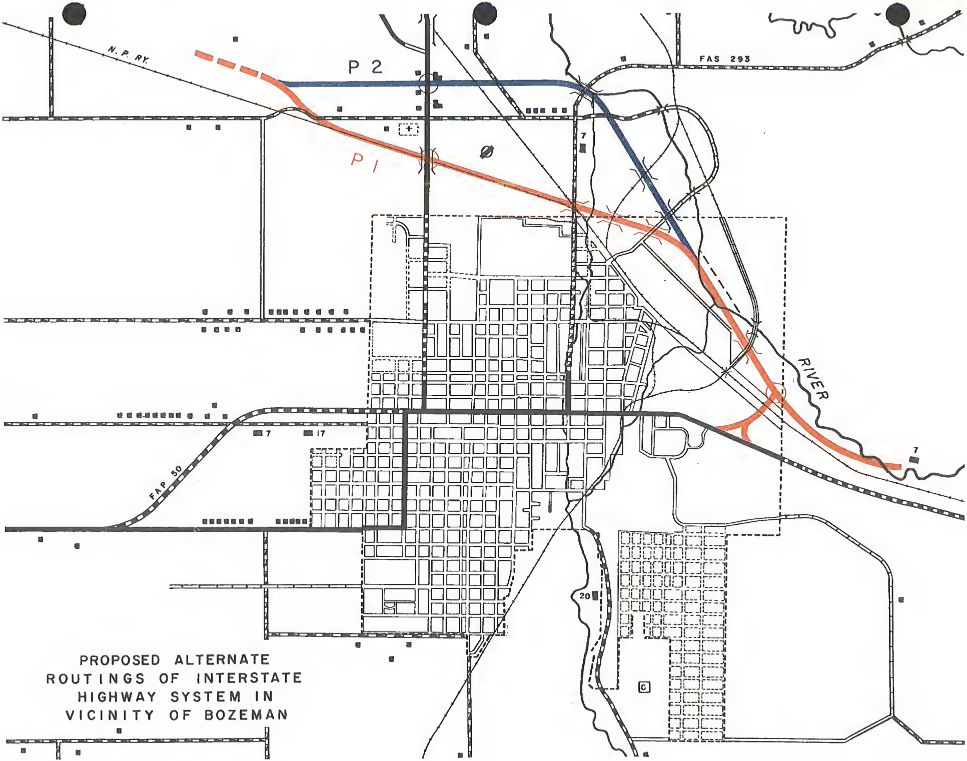
The results of this analysis show that, because of its more direct routing, the South Route would provide the shortest trip length, and because it would permit a greater proportion of travel on the high standard Interstate Highway, it would have a lower cost to the highway user per vehicle mile of travel.

The South Route also has a lower cost per vehicle mile of travel on the basis of construction and maintenance costs.

The results are presented in the following table:

	NORTH ROUTE	SOUTH ROUTE
Highway-user operating costs per trip	$0.4886	$0.4747
Construction and maintenance cost per trip	$0.0519	$0.0495
	$0.5405	$0.5242
Savings per trip for South Route		$0.0163
Annual savings for South Route		$20,668

The analysis reveals that the South Route would save the highway user and taxpayer $20,668 per year in comparison with the North Route. This amount of savings, however, does not assume significant proportions when compared with the total annual costs for the alternate routes of $683,032 for the North Route and $662,364 for the South Route. This amount of savings provides only a 3% differential in favor of the South Route. Such a differential is not conclusive in an analysis of this type, but it would lend support towards the selection of the South Route if other factors are favorable regarding this route.



PROPOSED ALTERNATE
ROUTINGS OF INTERSTATE
HIGHWAY SYSTEM IN
VICINITY OF BOZEMAN

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